

1 **CLAIMS**

2 1. A method comprising:

3 generating a mesh grid representation of uncovered surfaces of the object;

4 simulating hair in each of the grid elements; and

5 sampling the hair into a volume texture on a per-grid element basis.

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7 2. A method according to claim 2, further comprising:

8 parameterizing a texture in each of the grids.

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10 3. A method according to claim 3, wherein parameterizing the texture
11 comprises:

12 identifying one or more interactive control and/or viewing parameters
13 associated with each grid of the mesh which determine, at least in part, what
14 elements of the surface detail model are used to render surface detail in that grid
15 element.

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17 4. A method according to claim 4, further comprising:

18 generating a shell texture model for each grid of the mesh based, at least in
19 part, on the parameterization of the grid elements.

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21 5. A method according to claim 1, wherein developing a surface detail
22 model comprises:

23 generating a shell texture model for each element of a dynamically
24 generated grid representation of uncovered surfaces of an object.

1 6. A method according to claim 6, wherein generating a texture model
2 comprises:

3 generating a mesh grid representation of uncovered surfaces of the object;
4 simulating hair in each of the grid elements; and
5 sampling the hair into a volume texture on a per-grid element basis.

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7 7. A method according to claim 7, further comprising:
8 utilizing the volume texture to generate semi-transparent concentric shells
9 of the volume texture, which are layered over select areas of the object surface.

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11 8. A storage medium comprising a plurality of executable instructions
12 which, when executed, implement a modeling agent to develop a surface detail
13 model utilizing a modeling technique, and to render surface detail in accordance
14 with the developed surface detail model over an object surface.

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16 9. A storage medium according to claim 8, wherein the modeling agent
17 generates a mesh grid representation of uncovered surfaces of the object, simulates
18 hair in each of the grid elements, and samples the hair into a volume texture on a
19 per-grid element basis to develop the surface detail model.

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21 10. A storage medium according to claim 9, wherein the instructions to
22 implement the modeling agent further comprise instructions to parameterize a
23 texture in each of the grids.

1 11. A storage medium according to claim 10, wherein the instructions to
2 implement the modeling agent further comprise instructions to generate a shell
3 texture model for each grid of the mesh based, at least in part, on the
4 parameterization of the grid elements.

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6 12. A storage medium according to claim 10, wherein the instructions
7 develop the surface detail model comprise instructions to generate a shell texture
8 model for each element of a dynamically generated grid representation of
9 uncovered surfaces of an object.

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11 13. A storage medium according to claim 12, wherein the instructions to
12 generate a texture model comprise instructions to generate a mesh grid
13 representation of uncovered surfaces of the object, simulate hair in each of the grid
14 elements, and sample the hair into a volume texture on a per-grid element basis.

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16 14. A storage medium according to claim 13, wherein the instructions to
17 implement the modeling agent further comprise instructions to utilize the volume
18 texture to generate semi-transparent concentric shells of the volume texture, and to
19 layer the shells over select areas of the object surface.

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21 15. An apparatus comprising:
22 a modeling agent, to develop a surface detail model utilizing a modeling
23 technique appropriate for a given set of viewing parameters; and
24 a render engine, responsive to the modeling agent, to render surface detail
25 in accordance with the developed surface detail model over an object surface.

1 **16.** An apparatus according to claim 15, the modeling agent comprising:
2 a geometry preprocessor module, to generate a mesh grid representation of
3 uncovered surfaces of the object, to simulate hair in each of the grid elements, and
4 sample the simulated hair into a volume texture on a per-grid element basis.

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6 **17.** An apparatus according to claim 16, wherein the geometry
7 preprocessor parameterizes a texture in each of the grid elements.

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9 **18.** An apparatus according to claim 17, wherein the geometry
10 preprocessor generates a shell texture model for each grid element of the mesh
11 based, at least in part, on the parameterization of the grid element(s).

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1 **19.** An apparatus according to claim 15, wherein the surface detail
2 engine generates a shell texture model for each element of a dynamically generated
3 mesh grid representation of uncovered surfaces of an object.

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5 **20.** An apparatus according to claim 19, the surface detail engine
6 comprising:

7 a geometry preprocessor, to generate a mesh grid representation of the
8 uncovered surfaces of the object, to simulate hair in each of the grid elements, and
9 to sample the hair into a volume texture on a per-grid element basis.

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11 **21.** An apparatus according to claim 20, the surface detail engine
12 comprising:

13 a shell generator module, to utilize the volume texture and generate a semi-
14 transparent concentric shell(s).

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16 **22.** An apparatus according to claim 21, further comprising:
17 a memory device including a plurality of executable instructions; and
18 a controller, coupled to the memory device, to execute at least a subset of
19 the plurality of executable instructions to implement the surface modeling agent.